

(19)



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(11)

EP 0 698 485 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
28.02.1996 Bulletin 1996/09

(51) Int Cl.⁶: **B32B 15/08**, H05K 3/06,
C23F 1/02

(21) Application number: 95420217.2

(22) Date of filing: 26.07.1995

(84) Designated Contracting States:
DE FR GB

(30) Priority: 26.08.1994 US 297194

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(54) **Laminated metal structure and method of making same**

(57) The laminate of the invention is provided with an etch stop (18) to protect the laminate's adhesive layer (18). The etch stop (18) also circumvents any etching interference due to degradation products which would arise from breakdown of the adhesive layer (14). The etch stop (18) is a protective thin film in the form of a metal oxide, metal nitride, metal oxynitride, metal carbide or metal oxycarbide coating deposited on the back side of the metal sheet (10) prior to lamination onto the substrate (12) by means of an organic or semi-organic adhesive. The thin etch stop film is in the form of a blanket coating to assure adhesion to the metal sheet (10) surface and to the adhesive layer (14). It may be deposited onto the metal sheet (10) by standard vacuum deposition techniques such as DC and magnetron sputtering, thermal and E-beam evaporation, chemical vapor deposition, and plasma enhanced chemical vapor deposition methods. The thin film thickness is flexible, and can range in thickness from tenths of angstroms to microns.

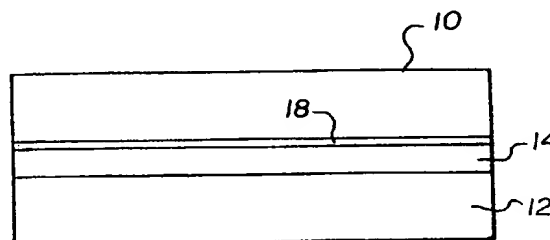


FIG. 3

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tion in accordance with the present invention.

Referring to Fig. 3, an etch stop 18 of alumina (Al_2O_3) is sputter deposited on the back surface of a metal sheet 10. By means of an adhesive 14 the alumina coated surface of the metal sheet 10 is laminated to the substrate 12. Alumina (Al_2O_3) is the preferred etch stop material for fluorine based etch chemistries.

EXAMPLE

Thin alumina films of approximately 2 micron thickness were sputter deposited onto two inch diameter 1 mil thick tungsten (W) sheets, and subsequently laminated onto 76 cm diameter silicon substrates using two different organic adhesives; Torr Seal manufactured by Varian Associates, Lexington, MA, and Able Bond manufactured by Ablestick Corp., Los Angeles, CA. A photoresist pattern having a resolution of 600 lines per mm was then laid down on the tungsten sheet. The structure was reactively ion etched in a standard commercial RF parallel plate RIE in a fluorine etch environment. The reactant gases used were composed of perfluorethane and sulfur hexafluoride.

The laminated tungsten sheets with the etch stop were successfully etched for both the Torr Seal and Able Bond adhesives. The etch profile illustrated in Fig. 4 shows that the metal 10 was not undercut at the junction 20 of the metal 10 and etch stop 18. Also the adhesive 14 was fully protected by the etch stop 18.

Claims

1. A laminate adapted for etching of a pattern thereon, the laminate comprising:
 - a) a metal sheet (10) having a first surface and a second surface, wherein the first surface is for receiving the pattern thereon,
 - b) an etch stop coating (18) adherent to the second surface of the sheet,
 - c) a substrate (12), and
 - d) an adhesive layer (14) bonding the substrate to the etch stop coating.
2. The laminate of Claim 1 wherein the etch stop coating (18) is a metal oxide, metal nitride, metal oxynitride, metal carbide or metal oxycarbide coating.
3. The laminate of Claim 2 wherein the etch stop coating (18) is Al_2O_3 .
4. The laminate of Claim 2 wherein the coating (18) is a vacuum deposited coating.
5. The laminate of Claim 1 wherein the adhesive (14) is an adhesive containing organics.
6. A method of laminating a metal sheet (10) to a substrate (12), the method comprising the steps of:
 - a) coating a surface of the metal sheet (10) with an etch stop (18) to provide a coated surface,
 - b) applying an adhesive (14) to the coated surface, and
 - c) laminating the metal sheet (10) and coated surface (18) to the substrate (12) by means of the adhesive (14).
7. The method of Claim 6 wherein the etch stop coating (18) is a metal oxide, metal nitride, metal oxynitride, metal carbide or metal oxycarbide coating.
8. The method of Claim 7 wherein the etch stop coating (18) is Al_2O_3 .
9. The method of Claim 6 wherein the adhesive (14) is an adhesive containing organics.
10. The method of Claim 7 wherein the etch stop coating (18) is effected by a vacuum deposition.

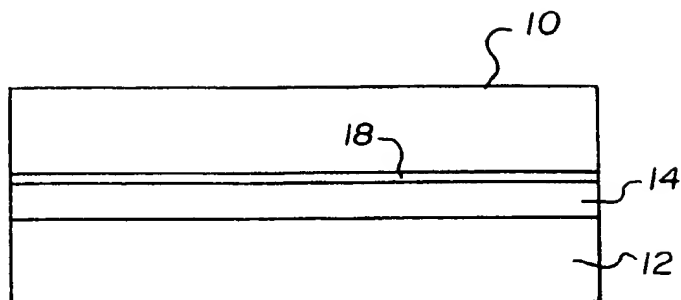


FIG. 3

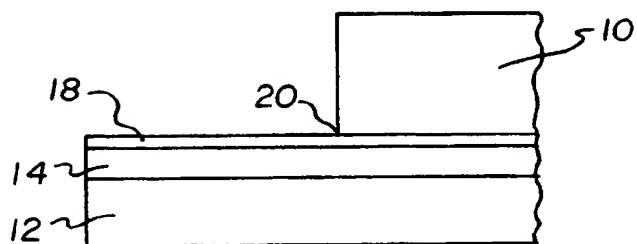


FIG. 4



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EUROPEAN SEARCH REPORT

Application Number
EP 95 42 0217

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	US-A-4 619 871 (TAKAMI MASATO) 28 October 1986 * claims * -----	1,5,6,9	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 21 November 1995	Examiner De Jonge, S
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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